

What is claimed is:

1. A swash plate type variable displacement compressor connected to an external drive source for compressing refrigerant gas that contains lubricating oil
5 comprising:
 - a cylinder block defining a cylinder bore;
 - a housing fixed to the cylinder block, the housing defining a crank chamber, a suction chamber and a discharge chamber;
 - a drive shaft supported by the housing and the cylinder block for rotation,
10 the drive shaft being driven by the external drive source, the drive shaft having an axis;
 - a swash plate supported by the drive shaft in the crank chamber so as to rotate integrally with the drive shaft, the swash plate being inclinable with respect to the axis of the drive shaft, an inclination angle of the swash plate being varied
15 in accordance with the pressure in the crank chamber;
 - a piston accommodated in the cylinder bore so as to define a compression chamber in the cylinder bore, the piston being coupled to the swash plate, the rotation of the swash plate being converted into the reciprocating movement of the piston, displacement of the compressor being varied by the
20 reciprocation of the piston in accordance with the inclination angle of the swash plate; and
 - a control mechanism for controlling pressure in the crank chamber, the

control mechanism including a bleed passage that interconnects the crank chamber with the suction chamber for decreasing the pressure in the crank chamber, wherein the compressor is formed such that the lubricating oil stored in the crank chamber is discharged into at least one of the suction chamber, the discharge chamber and the compression chamber while the inclination angle of the swash plate is substantially a maximum inclination angle.

2. The compressor according to claim 1, wherein the control mechanism includes:

10 a supply passage interconnecting the discharge chamber with the crank chamber; and

a control valve arranged on the supply passage for adjusting an opening degree of the supply passage, wherein the bleed passage has a constant inner diameter for continuously interconnecting the crank chamber with the suction chamber regardless the inclination angle of the swash plate.

3. The compressor according to claim 1, wherein the compressor is continuously driven while the external drive source is running.

20 4. The compressor according to claim 1, further comprising a communication path for interconnecting the crank chamber with the compression chamber while the inclination angle of the swash plate is substantially the

maximum inclination angle and the piston is located substantially at its bottom dead center.

5 5. The compressor according to claim 4, wherein the cylinder block has a bore surface that defines the cylinder bore, the communication path being a communication groove that is formed in the bore surface.

10 6. The compressor according to claim 5, wherein the communication groove includes an introduction portion for introducing the lubricating oil to the compression chamber, the introduction portion being broader at a crank chamber side than at a compression chamber side and forming substantially a sector in shape when viewed from the inside of the cylinder bore, a periphery of the piston at a swash plate side being positioned at the introduction portion when the piston is located substantially at its top dead center.

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7. The compressor according to claim 6, wherein the communication groove includes a straight flute portion that is formed at the compression chamber side of the introduction portion and that extends in an axial direction of the drive shaft.

20 8. The compressor according to claim 7, wherein a width of the straight flute portion ranges from 0 to $0.47B$, a central angle of the introduction portion ranging from 2 to $2 \tan^{-1} \{0.63B/2/(12+L)\}$, B denoting the diameter of the cylinder bore, L

denoting the distance between a hypothetical peak of the introduction portion and a rear end surface of the piston in a state that the inclination angle of the swash plate is the maximum inclination angle and that the piston is located at its bottom dead center.

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9. The compressor according to claim 6, wherein the communication groove is formed at the inner side of the bore surface of the cylinder block.

10. The compressor according to claim 5, wherein chamfers are formed
10 respectively at both side surfaces of the communication groove.

11. The compressor according to claim 5, wherein a chamfer is formed at a periphery of the communication groove at a compression chamber side.

15 12. The compressor according to claim 4, wherein the communication path is a communication groove that is formed in an outer circumferential surface of the piston.

13. The compressor according to claim 12, wherein chamfers are formed
20 respectively at both side surfaces of the communication groove.

14. The compressor according to claim 12, wherein a chamfer is formed at a

periphery of the communication groove at a compression chamber side.

15. The compressor according to claim 4, wherein the communication path is a communication passage that extends through the cylinder block.

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16. The compressor according to claim 15, wherein a chamfer is formed at an opening of the communication passage at a compression chamber side.

17. The compressor according to claim 4, wherein the communication path is
10 in communication with the compression chamber that is located in an upper side of the compressor in a state when the compressor is installed in a vehicle.

18. The compressor according to claim 4, wherein an end of the communication path at a crank chamber side is located in an inner circumferential
15 area near the drive shaft.

19. The compressor according to claim 4, wherein an end of the communication path at a crank chamber side is located in an outer circumferential area far from the drive shaft.

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20. The compressor according to claim 19, wherein the communication path is a communication groove that is formed in the housing and the cylinder block.

21. The compressor according to claim 20, wherein the cylinder block has a plurality of bore surfaces that define the cylinder bores, the communication groove being formed in each of the bore surfaces.

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22. The compressor according to claim 4, wherein a cross-sectional area of an end of the communication path at a crank chamber side is larger than any other cross-sectional area of the communication path.

10 23. The compressor according to claim 4, wherein the cylinder block has a shaft hole, the housing including a rear housing that is located at a rear end side of the drive shaft, the rear housing forming the suction chamber in an inner area in the rear housing and the discharge chamber in an outer area in the rear housing separately from the suction chamber, the compressor including a rotary
15 valve that is placed at a rear end of the drive shaft, the rotary valve being located in the shaft hole of the cylinder block and interconnecting the suction chamber with the compression chamber when the compression chamber is in a suction process, the communication path including a communication groove that is formed on an outer circumferential surface of the rotary valve.

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24. The compressor according to claim 1, wherein the control mechanism includes:

a supply passage interconnecting the discharge chamber with the crank chamber, and

a control valve arranged on the supply passage and the bleed passage, the control valve adjusting both opening degrees of the supply passage and the
5 bleed passage.